

BEST AVAILABLE COPYUSSN10/036,727
Atty. Docket No. 2001-0091-01**Remarks**

Claims 1-27 remain in the above captioned application. Claims 1-26 have been indicated as allowable. Claim 27 has been rejected under 35 U.S.C. §112, second paragraph. Applicants respectfully traverse the Examiner's rejection and respectfully request that the Examiner withdraw the rejection under 35 U.S.C. §112, second paragraph, and allow claim 27.

The Examiner has taken the position that the phrase "to occurs [sic, occur] at relative times so that no significant lasing results" is indefinite. The Examiner has taken the position that the Specification "does not provide a standard for ascertaining the requisite degree and one of ordinary skill in the art would not be reasonable apprised of the scope of the invention.

Applicants respectfully disagree.

The Specification notes:

In ArF, KrF and F₂ electric discharge lasers, the electric discharge lasts only about 50 ns (i.e., 50 billionths of a second). This discharge creates a population inversion necessary for lasing action but the inversion only exists during the time of the discharge. Therefore, an important requirement for an injection seeded ArF, KrF or F₂ laser is to assure that the seed beam from the master oscillator passes through discharge region of the power amplifier during the approximately 50 billionth of a second when the population is inverted in the laser gas so that amplification of the seed beam can occur. (p. 15)

The Specification also notes that the shortcoming in the art that the invention is meant to address includes:

In gas discharge lasers of the type referred to above, the duration of the electric discharge is very short duration, typically about 20 to 50 ns (20 to 50 billions of a second). Furthermore, the population inversion created by the discharge is very rapidly depleted so that the population inversion effectively exists only during the discharge. In these two laser systems, the population in the downstream laser must be inverted when the beam from the upstream laser reaches the second laser. Therefore, the discharges of the two lasers must be

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appropriately synchronized for proper operation of the laser system. This can be a problem because within typical pulse power systems there are several potential causes of variation in the timing of the discharges. Two of the most important sources of timing variations are voltage variations and temperature variations in saturable inductors used in the pulse power circuits. It is known to monitor the pulse power charging voltage and inductor temperatures and to utilize the data from the measurements and a delay circuit to normalize timing of the discharge to desired values. One prior art example is described in U.S. Patent No. 6,016,325 which is incorporated herein by reference. Thus in the prior art, timing errors can be reduced but they could not be eliminated. These errors that ultimately result are referred to as "jitter".

When a two chamber laser system is operating continuously the jitter problem can be dealt with by measuring the time between trigger and light out for each chamber and by providing feedback signals for subsequent pulses based on measured timing values for previous pulses such as the immediately preceding pulse. This technique does not work well; however, for the first pulse following an idle period because the temperature of electrical components tend to drift during idle periods changing the timing characteristics of the components.

What is needed is a better method of dealing with the jitter problem. (pp. 4-5)

The Specification goes on to explain at least one aspect of the solution for the shortcoming of the art as follows:

The present invention provides feedback timing control equipment and process for an injection seeded modular gas discharge laser. A preferred embodiment is a system capable of producing high quality pulsed laser beams at pulse rates of about 4,000 Hz or greater and at pulse energies of about 5 to 10 mJ or greater for integrated outputs of about 20 to 40 Watts or greater. The feedback timing control is programmed to permit in some circumstances discharges timed so that no significant laser energy is output from the system. Use of this technique permits burst mode operation in which the first discharge of a burst is a

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no-output discharge so that timing parameters for each of the two chambers can be monitored before the first laser output pulse of the burst. (p. 5)

Applicants submit that these disclosures adequately provide one skilled in the art with sufficient information to appreciate the meaning of the phrase "to occur at relative times so that no significant lasing results," e.g., such that "the first discharge [pulse] of a burst [of pulses] is a no-discharge, so that timing parameters for each of the two chambers can be monitored before the first laser output pulse of the burst."

For the above stated reasons the Examiner is respectfully requested to withdraw the rejection of claim 27 for indefiniteness under 35 U.S.C. §112, Second Paragraph.

The Examiner has also taken the position that claim 27 is indefinite under 35 U.S.C. §112, Second Paragraph for "omitting essential steps," including "the provision and utilization of elements that produce the claimed discharge, the feedback, the timing signal, the pulses, the programmed means," and therefore "it is unclear from the language utilized in said claim how any process or method can be followed or performed."

Applicants respectfully disagree.

A claimed process need not set forth in the claim all of the process steps necessary to complete the process. The use of the term "comprises" implies that there are other unrecited steps, some of which may be "necessary."

What 35 U.S.C. §112 requires is that claim be sufficiently clear and concise so that one skilled in the art will understand what constitutes infringement and what does not.

Claim 27 fulfills this requirement.

Together with the above referenced description and like disclosure in the Specification one skilled in the art can understand that infringement occurs in the process of using a MOPA configured laser when the timing of the discharge pulses in "a burst of pulses produced by a MOPA laser" are such that "at least a first set of discharges at the start of said burst of pulses are programmed to occur at relative times so that no significant lasing results ..."

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The other details to which the Examiner refers as "necessary" process steps are not "necessary" to understanding the scope and meaning of the claim.

For the above stated reasons, the Examiner is respectfully requested to withdraw the rejection of claim 27 based on 35 U.S.C. §112, Second Paragraph and allow claim 27.

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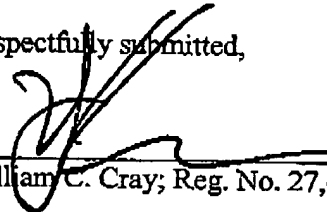
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Conclusion

For the above stated reasons the Examiner's rejections of claim 27 under 35 U.S.C. §112, Second Paragraph are not proper and applicants have respectfully requested that the Examiner withdraw the rejections and allow claim 27, along with claims 1-26 already found to be allowable.

No fees are due in connection with this submission, however, if any fees are required, the Commissioner is authorized to charge any fees, or to credit any overpayment to our Deposit Account No. 03-4060.

Respectfully submitted,


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